Remarks/Arguments

Claims 1, 11, 17 and 22 have been amended to further define the parameters "a" and "b" as well as accurately describe the single pendant polyether-containing side chain as having an "average molecular weight" (MW). Using the "blend average molecular weight (BAMW)" terminology for the formulas/structures shown in Applicants' claims is actually misleading. The amendments have corrected this ambiguity.

The present invention provides a silicone surfactant (polyether-polysiloxane copolymer) for stabilizing the cell formation in the preparation of rigid polyurethane and/or polyisocyanurate foam blown with C4 and/or C5 hydrocarbon (HC) blowing agents. The silicone surfactant comprises a polyether-polysiloxane copolymer represented by the formula shown in the pending claims. The copolymer formula defines only one pendant polyether side chain.

Claims 1 and 6-22 have been rejected under 35 USC 112, second paragraph, the Examiner alleging the Claims are confusing because the terms "a" and "b" are undefined, where "a" represents the number of ethylene oxide units and "b" represents the number of propylene oxide units. Applicants submit the Claims are not confusing because the other defined parameters in the Claims coupled with the knowledge that "the mole% of ethylene oxide in the polyether portion" means "(a/(a+b)) x 100" clearly establishes the values for "a" and "b" to one skilled in the art. See the table in paragraph [0030]. Nevertheless, Claims 1, 11, 17 and 22 have been amended with specific values for "a + b" to augment the skilled worker's understanding. Support for the amendments can be found in paragraphs [0029 and 0030]. Therefore, Applicants request reconsideration of this rejection and its withdrawal.

Claims 1-22 have been rejected under 103a as being anticipated by Chojnacki (US 5,883,142). Applicants submitted that Chojnacki neither anticipates nor renders obvious the subject matter as a whole defined by the pending claims. Chojnacki is deficient with respect to teaching or suggesting the preparation of C4-C5 HC-blown rigid polyurethane foams using a silicone surfactant comprising a polyether-polysiloxane copolymer of the formula in Applicants' pending claims, such surfactant containing only one pendant polyether group.

The Examiner stated that changes in result effective variables are not patentable where the difference involved is one of degree not of kind; experimentation to find workable conditions generally involves no more than routine skill in the art.

It is known that silicone surfactant performance can be altered by changing backbone and pendant parameters. Once the general architecture of a silicone surfactant has been established (the inventive step) it may then be possible to optimize by systematically varying the backbone and pendant structures. Optimization assumes a sufficient degree of understanding of the relevant effects and interactions that the process becomes routine to one skilled in the art. However, the state of the art for silicone surfactants is such that it cannot be known *a priori* that optimization within a selected structural range will in fact deliver certain, acceptable performance, or even any improvements at all, for the specific foam formulations requiring improvement. Moreover, it is not practical to "globally" optimize a silicone structure due to the large numbers and wide ranges of the relevant variables; thus insight is required to target a structural range as Applicants have done. It is also not possible to predict the interactions of the surfactant with a complex, multi-component foam formulation with a sufficient degree of precision to establish a silicone structural range likely to yield to optimization.

Furthermore, the requirement for more than one kind of pendant polyether group is a matter of kind, not degree. Pendants are critically important to the functioning of a surfactant, and while some generalizations are possible, the art does not provide sufficient guidance to determine whether one, two or more different pendants are required to deliver the targeted improvements. It is conceivable that this question could be posed as part of an optimization attempt. However, in this instance Chojnacki provides no motivation to consider silicones with other than two different pendants, so one skilled in the art would not routinely include this as an element of the attempted optimization. Optimizing pendant backbone length (a+b) and polyether ratio (a/b) cannot provide information on the need for a different number of distinct pendants. This decision is made as part of the inventive step unless the attempted optimization explicitly includes the consideration of multiple pendant types.

As to criticality of Applicants' pendant MW (BAMW) range, this has in fact been demonstrated by Chojnacki, Table 2, Examples 3 and 4, which show that low BAMWs and high EO contents give distinctly inferior performance (meaning high k factors and low closed cell contents), as well as by Examples 19-21 of the present application.

Most importantly, Chojnacki's copolymer contains two different polyether side chains, namely **R** and **R'**, a very significant structural difference from the copolymers of Applicants' claims. There is no teaching, direction or motivation whatsoever in Chojnacki to remove one of the pendant polyether groups to afford a silicone copolymer like Applicants' copolymer. Chojnacki's silicone surfactants are made by the simultaneous reaction of the siloxane backbone with the allyl terminated R and R' polyethers, with the R and R' polyethers in a specifically chosen ratio; whereas Applicants' surfactants are made by omitting the incorporation of a second polyether side chain.

On a purely semantic/technical basis Chojnacki defines the silicone surfactant in terms of polyether blend average molecular weight (BAMW), which is a definition that only has meaning if there is more than one type of pendant. If a=c and b=d then a simple MW would suffice to describe the polyether, so this would argue that the Chojnacki invention was conceived to require multiple polyethers.

On a more scientific basis, the cited prior art for third generation blowing agent surfactants focused on lower MW, single pendant type surfactants which did not address all the performance issues associated with these new blowing agents. One skilled in the art building on the Chojnacki teachings would not therefore be motivated to return to this simpler architecture to address performance deficiencies. The decision to include more than one pendant is not a simple optimization step, since the complexity of the problem is greatly increased if there is an attempt to optimize more than one pendant. One skilled in the art would not add this additional complexity if there was reason to believe that a simpler single pendant architecture would suffice. This decision must be made as part of the inventive step, so initiating development of a 2+ pendant type surfactant would not lead to a single pendant type as the optimum product.

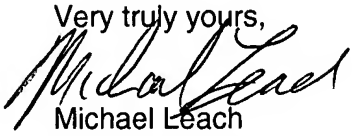
Furthermore, while the silicone surfactant formula of Chojnacki and that of the pending claims may have overlap in certain parameters, the blend average molecular weight (BAMW) of the polyether portion in Chojnacki's surfactants is 1200-6000 g/mole whereas in the present claims the MW is 450-1000 g/m.

Examples 3 and 4 in Chojnacki's Table 2, demonstrate that structures with polyether pendant BAMWs in the 550-750 range performed significantly worse as cell structure regulators when compared to the range of 1200-6000 for the silicone surfactants in Chojnacki's HFC and HCFC blown foams. Since Chojnacki is not directed toward HC blowing agents, it can provide no direction or motivation to a worker of ordinary skill in the art that moving to the unacceptable BAMW range and removing one of the polyether side chains would improve performance with HC blowing agents. Moreover, the examples in Applicants' specification show the advantages achieved using Applicants' defined silicone surfactants and C4 and/or C5 HC-blown rigid polyurethane compositions over the claimed ranges. The advantages include superior insulating ability (lower k factor), improved system clarity (lower numerical rating) and less phase separation, both of which lead to improved handling in a manufacturing environment, as well as less voiding, meaning fewer imperfections in the foam cell structure.

Accordingly, Applicants submit that Chojnacki also does not make out a *prima facie* case of obviousness of the claimed subject matter as a whole defined by Applicants' pending claims. Even though a 103a rejection has not been made out by the Examiner, Applicants have presented evidence in their Examples regarding the scope of the showing of unexpected results. Applicants request reconsideration of this rejection and its withdrawal.

Believing the case is in condition for allowance Applicants solicit an action to that effect.

Very truly yours,



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